

C H A P T E R

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**Medicare and rural health care:  
overview and challenges  
for policymakers**

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## Medicare and rural health care: overview and challenges for policymakers

Policymakers and rural health care advocates have long been concerned that Medicare beneficiaries and others living in rural areas may not get all of the care they need. The geographic isolation, low population density, and poor economic conditions in many rural areas impose economic hardship on existing providers and make it difficult to attract health professionals. In this chapter we describe these concerns, how market conditions vary among rural areas, and how those variations affect rural providers and beneficiaries. Our analyses confirm that some rural communities face adverse economic conditions that may limit local providers' abilities to furnish a broad array of needed services. Nevertheless, Medicare beneficiaries in rural areas receive similar amounts of health services, on average, as urban beneficiaries. Although similar use rates do not guarantee that rural and urban beneficiaries receive equally appropriate and effective care, this finding suggests that major new Medicare policy interventions may not be needed to preserve rural beneficiaries' access to high-quality care. Some incremental changes may be helpful in better adapting Medicare's policies to rural market conditions. Because the stresses affecting rural providers often reflect broader market conditions, however, Medicare policy changes alone may not be enough to resolve them fully.

### In this chapter

- What is rural?
- Rural health care
- How rural markets differ
- Medicare beneficiaries' use of services
- Potential implications for Medicare and other public policies

In the Balanced Budget Refinement Act of 1999 (BBRA), the Congress required that the Medicare Payment Advisory Commission (MedPAC) study and report on several issues concerning Medicare's payment policies for rural providers. Two of these studies focus on the adequacy and appropriateness of payments to rural providers under the new prospective payment systems (PPSs) for hospital outpatient department services and home health care. Another study must evaluate the effectiveness of various special payment provisions for rural hospitals under the hospital inpatient PPS and their impact on beneficiaries' access to services and the quality of the care they receive. Finally, a fourth study focuses on whether low-volume hospital-based psychiatric facilities located in rural areas have higher costs per discharge than other inpatient psychiatric providers.

These topics reflect several concerns shared by rural policymakers, providers, and health care advocates. One is concern about the effects on rural providers of Medicare policy changes enacted in the Balanced Budget Act of 1997 (BBA). This concern is largely driven by a perception that the health care infrastructure in many rural communities is financially fragile and thus especially sensitive to changes in Medicare's policies, even those that might have little impact under other circumstances. In addition, because rural health care providers often account for a substantial share of local employment and are viewed as indispensable in attracting new businesses to the local economy, increases in their financial stresses are seen as threatening the community's survival.

Another widely shared concern is that Medicare's nationally determined policies do not adapt appropriately to the diversity of local conditions and needs in rural areas. Some of this concern reflects a judgment that Medicare's payment policies under the traditional program fail to account adequately for local market factors that affect rural providers' costs but are beyond their control. Questions are also frequently raised about whether Medicare's administrative policies—conditions of participation or billing rules,

for instance—make sufficient allowance for rural providers' limited administrative capabilities.

Underlying these concerns are more fundamental fears. The ever-rising technological sophistication and expense of modern medical care, coupled with weak economic conditions in many rural markets, challenges rural communities' abilities to preserve delivery systems capable of meeting their residents' health care needs. Medicare's policies may compound these difficulties in some rural areas, resulting in financial pressure for key providers and threatening access to local services for Medicare beneficiaries and other residents.

These concerns highlight important questions for policymakers:

- Do rural and urban beneficiaries receive similar amounts and mixes of health services?
- Do rural beneficiaries have appropriate access to high-quality care under the traditional program?
- Are national quality standards (and other uniform administrative requirements) appropriate for rural providers and plans?
- Do Medicare's payments to rural providers appropriately reflect differences in market conditions?
- What might be done to improve rural beneficiaries' access to alternative plans under the Medicare+Choice program?

We examine these questions in subsequent chapters of this report. In addition, we consider whether, and to what extent, the issues confronting rural providers and beneficiaries reflect limitations of Medicare's policies or problems beyond its scope. Finally, we make recommendations on how the Congress and the Health Care Financing Administration (HCFA) might respond to the problems identified.

In this chapter, we examine the diversity of conditions facing providers and beneficiaries in rural markets, related

potential problems, and their implications for Medicare and other policies. We begin with a brief discussion of how rural areas and markets are defined. Then we describe key features of rural health care, summarizing the types of adverse conditions that rural providers and beneficiaries may be facing. The next section examines diversity among rural markets, focusing on important economic factors that may affect local demand for and supply of health services. Then we examine urban and rural beneficiaries' service use patterns to see whether differences in market conditions may be affecting the quantity or mix of care they receive. Finally, we consider the potential implications of market diversity for Medicare and other public policies.

Although preliminary, these analyses support two conclusions. One is that policymakers' concerns are well founded—many rural communities are facing a variety of adverse market conditions, including small and declining populations, a disproportionate share of aged residents, low household incomes, high unemployment, and disproportionate numbers of minority residents. Distinct combinations of these factors may affect local market demand for and supply of health services in different regions, with varying potential effects on beneficiaries' and other residents' access to high-quality care. These factors reflect the diversity of local markets, however, not the Medicare program.

The other conclusion is that the available evidence gives no indication that Medicare beneficiaries living in rural areas are facing widespread serious problems. On average, they receive health services that are similar in quantity and scope to those consumed by their urban counterparts. This does not mean that rural beneficiaries (or urban ones either) always get all of the care they need or the most appropriate and effective care. But it also does not suggest that they suffer from widespread major deficiencies compared with urban beneficiaries.

Nevertheless, Medicare has an obligation to adjust its payment policies to accommodate differences in market

conditions that would affect efficient providers' costs but are beyond their control. Medicare has not always adapted its policies appropriately, but necessary changes in those policies are not large. Adjustments are needed, not fundamental changes in direction.

## What is rural?

The U.S. Bureau of the Census (Census Bureau) and the U.S. Office of Management and Budget (OMB) have developed definitions of urban and rural areas (Ricketts et al. 1999). In both systems, rural areas are defined by default, as areas that are not urban. The Census Bureau uses an expansive definition of urban areas based on population size and density. Urban areas include people, territory, and housing units in places with at least 2,500 people. Most urban

residents, however, live in "urbanized areas" that include urban places with at least 50,000 people and surrounding areas with a population density of at least 1,000 people per square mile. Rural areas encompass everything not included in urban places.

OMB defines urban and rural areas based on the population size and density of counties. A metropolitan (urban) county may have a large city and suburbs or it may be a peripheral county that is economically and socially integrated with a city located in a nearby county. OMB also defines metropolitan areas and metropolitan statistical areas (MSAs), which consist of one or more central and well-integrated outlying counties; 868 U.S. counties were classified as metropolitan in 1998. The remaining 2,273 counties were considered nonmetropolitan (rural).

In 1990, the Census Bureau classified 24.8 percent of the population as rural, but almost half of these people lived in OMB-defined metropolitan counties.<sup>1</sup> Urban areas often account for only a small fraction of the total land area included in metropolitan counties (Figure 1-1). Similarly, about 10 percent of people classified as urban lived in nonmetropolitan counties; rural counties sometimes include urban places. Following the OMB definitions—rural residents are those who live in nonmetropolitan counties—would treat about 20 percent of the population as rural.

Medicare uses MSAs and nonmetropolitan counties in each state (statewide rural areas) to set payment rates for services furnished by facility providers—for example, hospital inpatient care, hospital outpatient services, or skilled nursing care (see Chapter 4).<sup>2</sup>

**FIGURE  
1-1**

## Defining urban and rural



Source: Analysis of U.S. census data by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

<sup>1</sup> Comparable data from the 2000 census are not yet available.

<sup>2</sup> Medicare uses a slightly modified version of OMB's definitions, reflecting a variety of statutory provisions that treat certain nonmetropolitan counties as if they were part of specified MSAs.

HCFA uses these areas to classify providers as urban or rural and to adjust Medicare's PPS payment rates to reflect geographic differences in market prices for labor inputs. This adjustment is based on an input-price index that HCFA calculates annually using MSAs and statewide rural areas to define 325 urban and 47 rural labor market areas. Rural hospitals are located only in nonmetropolitan counties; they are relatively dense in the East, South, and Midwest, but geographically dispersed in the West (Figure 1-2).

To describe differences among urban and rural areas, demographers have developed other definitions that are intended to capture nonmetropolitan counties' isolation or degree of ruralness based on their population density, whether they are adjacent to an urban area, the population of their largest town, or their total urban population. Frontier counties, for example, are considered the most isolated rural counties because they have fewer than seven people per square mile.

We often use urban influence codes (UICs) in this report to examine differences among rural areas. UIC codes divide counties into nine categories—two urban and seven rural (Ghelfi and Parker 1997). Urban categories are based on whether counties are included in a large MSA (with a population of 1 million or more) or a small one (population of less than 1 million). The seven categories for nonmetropolitan counties reflect whether or not a county is adjacent to an MSA and the size of its largest town (Figure 1-3). In this scheme, the most urbanized rural counties are those adjacent to an MSA and with a largest town of at least 10,000 people. The most rural counties (completely rural) are those not adjacent to an MSA and with a largest town of fewer than 2,500 people.

Furnishing health services in rural communities often entails overcoming multiple adverse conditions. Many rural areas are isolated, with long distances (or physical barriers, such as mountains or rivers) between towns and cities; these conditions are sometimes compounded by poor roads and bad weather (Williamson 2001). Further, rural areas often have a weak economic base with limited capacity to support modern health care delivery (Ricketts et al. 1999, Schur and Franco 1999, Rosenblatt 2001).

For the most part, the health care delivery system is market driven. Given a weak economic base, producing the full range of health care services with today's costly technologies is impossible for rural communities (Rosenblatt 2001). With small populations and limited diagnostic and therapeutic resources, few rural communities can attract physician specialists. In addition, many have difficulty attracting and retaining primary care physicians, well-trained support staff, and other practitioners, such as dentists or

## Rural health care

The research and policy literature on rural health care generally paints a gloomy picture of medical practice in rural areas.

**FIGURE  
1-2**

### Locations of rural hospitals

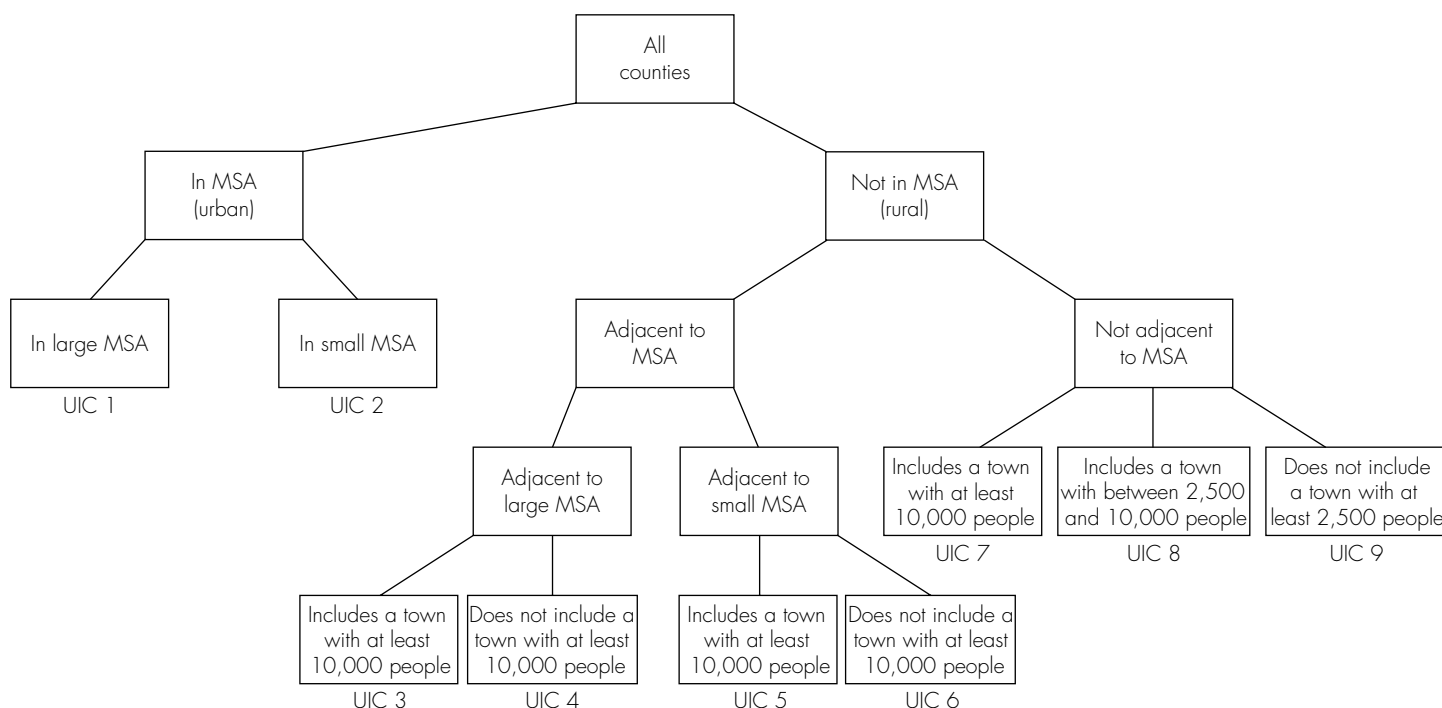


Note: Gray areas represent metropolitan counties, 1999.

Source: Analysis of hospital location data from HCFA by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**FIGURE  
1-3**

## Definition of urban influence codes



Note: UIC (urban influence code, as defined by the U.S. Department of Agriculture), MSA (metropolitan statistical area, as defined by the U.S. Office of Management and Budget).

Source: Ghelfi and Parker (1997).

physical therapists. Rural counties account for about 20 percent of the population, but only about 10 percent of all active physicians.

The number of primary care physicians engaged in patient care per 100,000 people generally is lower in more rural counties (Rosenblatt and Hart 1999). Although the supply of family physicians and general practitioners is roughly even across counties with different UIC codes, internists, general surgeons, obstetrician-gynecologists, and pediatricians tend to be concentrated in counties that have one or more towns with at least 10,000 people.

Some rural areas face chronic shortages of health professionals and facilities. In general, these areas have four characteristics in common (Rosenblatt and Hart 1999):

- sparse population,

- extreme and persistent poverty,
- a high proportion of racial or ethnic minorities, and
- lack of physical and cultural amenities.

Federal and state programs attempt to fill the gaps in these areas with a combination of direct service programs, subsidized or cost-based payments to providers, and subsidized health insurance for low-income residents. These programs include Community and Migrant Health Services, the Indian Health Service, rural health clinics (RHCs), the National Health Service Corps, Medicaid, and the State Children's Health Insurance Program.

Rural practice also has been changing in response to the increasing complexity of medical technology and shifts in the organization of care (Rosenblatt 2001). The range of clinical practice once was

defined by the set of services a general practitioner in solo practice could provide. General practitioners in solo practice, however, have been replaced by group practices of two to five physicians, often with support from other professionals, such as nurse practitioners, physician's assistants, or nurse midwives. In addition, many practices are now affiliated with some form of rural practice network based at a rural referral hospital or an urban hospital.

Affiliation with a network may bring a variety of benefits, such as administrative support, purchasing efficiencies, or greater access to capital. Increasingly, however, decisions about health care organization, administration, or payment are made by referral partners, insurers, or state and federal regulators who are not local and therefore may be insensitive to or ignorant of local needs.

## How rural markets differ

Many rural communities face market conditions that may depress demand or supply, and potentially decrease access to and use of health services among beneficiaries and other residents. Depending on the community, these factors include:

- a small population,
- a declining and disproportionately older population,
- low household incomes, relatively high unemployment rates, and high poverty rates,
- a high proportion of the population lacking health insurance or with limited coverage,
- physical isolation, with long distances to urban centers for specialty care, and
- weak or restrictive state policies (for example, in Medicaid eligibility and payment policies, or certificate of need laws).

To explore further the diversity of conditions among rural markets, we contracted with the Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill, to analyze data on population characteristics and health care supply. Because the health care delivery system in almost all rural markets is centered around one or more hospitals, we chose to use rural hospital markets based on patient origin data as the focus for this analysis (see text box).

Using hospital market definitions, the staff of the Sheps Center calculated totals, averages, or medians, as appropriate, for a range of variables, including market population, the percentage change in population between 1990 and 1999, proportions of the population by age group or household income, or percentage of the working-age population employed. These measures were based on ZIP-code level data purchased from Claritas Corporation and derived mainly from the 1990 census or later surveys carried out

## Defining hospital markets and measuring market factors

Urban and rural hospitals' markets were defined by the staff of the Cecil G. Sheps Center based on the ZIP codes of origin—patients' residences—for their Medicare discharges. The staff defined markets by selecting ZIP codes in descending order of their contributions to hospitals' Medicare discharges, adding new ones until the cumulative area accounted for a preset percentage of hospitals' Medicare volume. The objective was to include all local ZIP codes that account for the bulk of a hospital's Medicare acute inpatient care without including remote areas that would have little effect on measured market conditions. Because many urban hospitals attract a substantial portion of their patients from surrounding rural areas, this goal was achieved with a Medicare volume threshold of 60 percent. Rural hospitals, however, attract most of their patients from nearby areas; thus, the threshold for rural markets was set at 80 percent.

This process produced hospital-specific markets made up of one or more ZIP codes. These markets are not mutually exclusive; two hospitals

may draw substantial numbers of patients from the same ZIP code. Moreover, they are based on Medicare beneficiaries' observed use patterns, which reflect the current size and distribution of facilities, the health care delivery roles they have chosen, and beneficiaries' travel capabilities and preferences. Hospitals' characteristics and their market conditions are thus interrelated. Although their size and service capabilities generally reflect the size and characteristics of the local population, occasionally a large hospital with broad service capabilities may prosper in a rural area because it can draw patients from well beyond its local service area. The equilibrium also can change; if the supply or distribution of facilities changes through entry, exit, or conversion to some other use, the market areas, their populations, and other characteristics also would likely change. Similarly, changes in the number and mix of local industries and employers also might change the size and characteristics of the population, potentially causing providers to alter their size and capabilities. ■

by the Census Bureau. The center staff then displayed summaries of the various measures in tables, charts, or maps.

Certain factors may affect beneficiaries' and other residents' access to nearby health services through their effects on service demand and financial outcomes for local providers. For example, a substantial proportion of rural hospitals serve small markets. The potential implications for service demand can be illustrated by some rough calculations.

One-quarter of all rural hospital markets include fewer than 11,900 people. Only about 10 percent of the population—20 percent of Medicare beneficiaries—is

admitted for inpatient hospital care during a year. If they provided all of the inpatient care used by local residents, hospitals serving markets with 12,000 people would have about 1,200 admissions per year. With an average length of stay of 6 days, they would furnish 7,200 patient days per year, with patients occupying about 20 beds each day, on average. Perhaps one-half or more of patient stays, however, would entail relatively sophisticated services that require expensive equipment and specialized staff that are not available in small rural hospitals. These patients would go to larger rural or urban hospitals. Allowing for variability in admissions and lengths of stay for the remaining 600 patients, only about 10-15



beds would be needed in these small hospitals to meet local demand for routine inpatient care—even fewer if some residents patronized other nearby hospitals that also serve parts of the same market.

At this volume level, many hospitals would experience serious financial stress (see Chapter 4). The relatively high fixed costs of operating a hospital must be spread over few patients, raising the unit cost of care. Economies of scale associated with task specialization are not available at low volume. Unit costs also might be affected if—as advocates assert—hospitals in small or declining communities face higher costs in attracting and retaining physicians and other health professionals.<sup>3</sup> Other things being equal, higher unit costs resulting from any of these factors would lower hospitals' Medicare inpatient margins and their total margins.

The financial difficulties of operating at low volume may be compounded by other market factors, such as low household incomes or a high proportion of the population lacking health insurance.<sup>4</sup> These factors are likely to affect providers' financial viability by further reducing service volume or revenues for non-Medicare patients, perhaps increasing the burden of uncompensated care. Other things being equal, these factors could substantially reduce hospitals' total margins while having little effect on their Medicare inpatient margins.

Changing population demographics—particularly the emigration of working-age residents—also likely affect the amount and types of health facilities and practitioners rural communities need, and increase providers' vulnerability to policy changes in Medicare and state programs such as Medicaid. Providers in small or declining rural areas may be especially vulnerable to Medicare policy changes

because program beneficiaries account for a larger share of their overall service volume and revenues compared with providers in other rural and urban areas. Further, these providers often derive a large share of their revenues from services furnished in settings—such as outpatient departments, skilled nursing facilities (SNFs), and home health agencies—that have been most affected by recent Medicare policy reforms.

## Preliminary findings

Using the hospital market data, we analyzed the variation in many of these factors among market areas and geographic regions. We also explored the relationships between these market factors and hospitals' financial performance, including their Medicare inpatient margins and total margins. These analyses have thus far only scratched the surface of the complex relationships among the various market factors and between those factors and providers' financial performance. Nevertheless, our analyses appear to support several preliminary conclusions:

- Economic conditions vary widely among rural markets.
- Rural markets in the West have different sets of risk factors than those in the East.<sup>5</sup>
- The main risk factors in the West include combinations of markets with small populations, declines in market populations during the 1990s, and populations with disproportionate numbers of residents ages 65 or older. These factors raise the likelihood that providers will operate at low volume, which adversely affects providers' unit costs, Medicare inpatient margins, and total margins.

- The main factors operating in the East are more complicated, and how they interact is still murky. Hospital markets in the East often exhibit low household income and high unemployment rates. They also often have high proportions of racial and ethnic minorities. These factors appear to affect providers' total margins more than their Medicare inpatient margins, suggesting that much of the market weakness may be on the private side—perhaps primarily reflecting large numbers of people who lack health insurance.

## Factors affecting hospital markets in the West

Population is one of the major factors that affects demand and supply in a market. Market population declines sharply for hospitals located in more rural counties (across UIC categories). This relationship holds across regions, but market population levels are generally twice as high in the East compared with the West, which probably reflects differences in population density across regions. Hospital markets with small populations—those with 11,900 or fewer people, the bottom quartile of the distribution of market population among rural hospital markets—are concentrated in the West, especially in the Plains states (Figure 1-4). Only 6 percent of rural markets in the East have small populations, compared with 40 percent of those in the West.

In addition to small populations, many hospital markets in the West experienced population declines during the 1990s—the ZIP codes included in the market area lost population between 1990 and 1999—and also had disproportionate numbers of residents ages 65 or older (Figure 1-5).<sup>6</sup> Of the 471 hospital markets in the West that have a small population base, 245 (52

3 The wage and salary data hospitals report annually do not appear to support this claim (see Chapter 4). Another possibility is that small hospitals face lower productivity and higher unit costs because they are unable to attract an efficient mix of staff given their mix of service outputs.

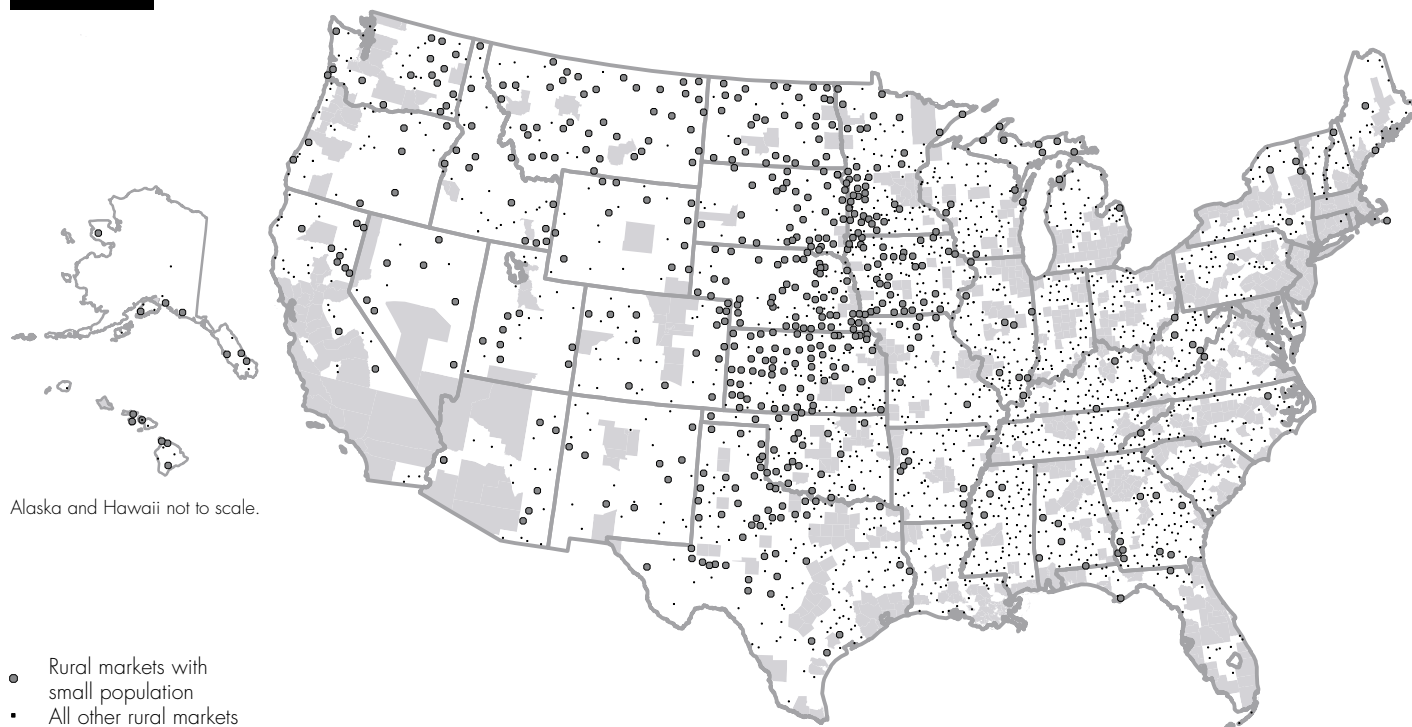
4 Unfortunately, we do not have ZIP code level information about the proportion of the population lacking health insurance.

5 The East and West regions are divided by the Mississippi river. The East includes New England, Middle Atlantic, South Atlantic, East South Central, and East North Central Census divisions; the West includes West South Central, West North Central, Mountain, and Pacific divisions.

6 ZIP code population estimates for 1999, which were used in estimating the average annual change in population for each hospital market after 1990, were based on population projections made by Claritas Corporation.

**FIGURE  
1-4**

## Rural markets with small population base

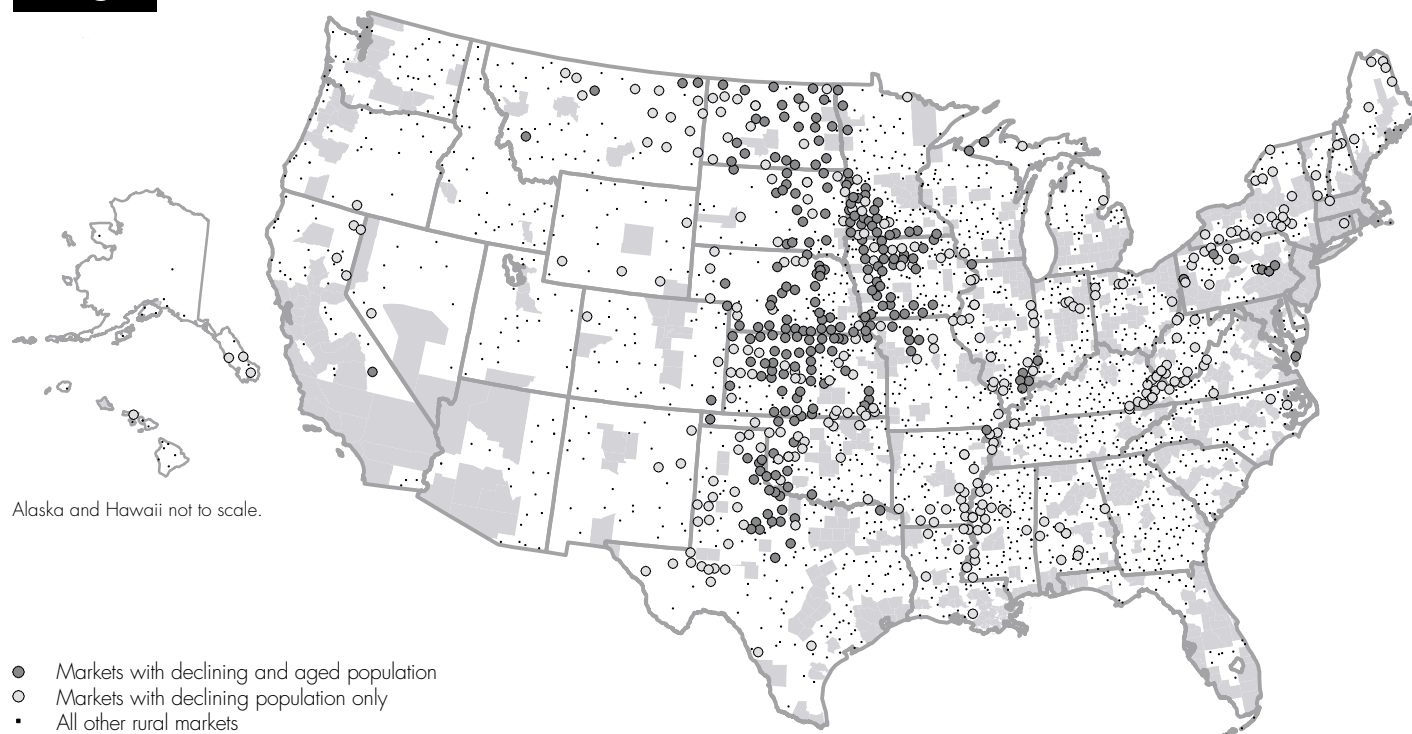


Note: Markets with small population had fewer than 11,900 residents in 1999. Gray areas represent metropolitan counties, 1999.

Source: Analysis of Claritas Corp. estimates based on 1990 census by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**FIGURE  
1-5**

## Rural markets with declining and aged populations



Note: Markets with declining population lost -0.1 percent of total population annually between 1990 and 1999. Markets with declining and aged population also had 20 percent or more aged 65 or older. Gray areas represent metropolitan counties, 1999.

Source: Analysis of Claritas Corp. estimates based on 1990 census by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

percent) had population declines and 166 (35 percent) also had a high share of older residents (Table 1-1).

Markets with declining populations also occur in the East: along the Mississippi river, in Appalachia, in Western New York and Western Pennsylvania, and in northern New England. These markets usually include larger populations, however, and they generally do not have a disproportionate share of older residents.

Hospitals serving small markets tend to have poor financial outcomes, especially low total margins. Moreover, providers' total margins tend to deteriorate where the market population has been declining, and worsen further where the population is disproportionately 65 or older. Although other mechanisms may be involved in these relationships, a major one is that providers facing these conditions are highly likely to operate at low inpatient volume. Two-thirds of the hospitals serving small markets in the West have fewer than 500 acute discharges per year.

### Factors affecting hospital markets in the East

Many rural hospital markets in the East encompass populations with low household incomes; about 45 percent of all rural markets had median annual incomes less than \$28,100—the bottom quartile of household income for all hospital markets (urban and rural) in 1999. About 30 percent of all markets had unemployment above 8.1 percent—the top quartile of the distribution in 1999. Finally, many hospital markets serve populations that include concentrations of racial or ethnic minorities.

Hospitals serving markets with any of these characteristics tend to have above-average financial performance under Medicare's inpatient PPS, but substantially below-average overall financial performance (total margins). Moreover, high unemployment tends to compound the effects associated with low household income, resulting in much lower total margins. These factors are often accompanied by concentrations of

**TABLE 1-1** Percentage of rural hospital markets with selected characteristics, by region

Market/hospital characteristic	All markets			Markets with small population		
	All	East	West	All	East	West
Small population	25.0%	6.0%	40.0%	100.0%	100.0%	100.0%
Declining population	24.3	14.6	32.1	49.6	28.3	52.1
Declining population and disproportionately aged	10.3	1.7	17.3	32.4	8.3	35.3
Low household income	44.7	45.5	44.1	48.7	65.0	46.7
High unemployment	30.2	35.1	26.2	21.1	55.0	17.0
Isolated location	18.5	7.3	27.6	34.3	18.3	36.3
Low volume	21.7	8.1	33.2	65.6	54.5	67.0

Note: East and West regions are divided by the Mississippi river; East includes New England, Middle Atlantic, South Atlantic, East South Central, and East North Central census divisions, while West includes West South Central, West North Central, Mountain, and Pacific divisions. Small population = fewer than 11,900 people; declining population = average annual population change from 1990 to 1999 of at least -0.1 percent; disproportionately aged = at least 20 percent of the population in the market ZIP codes is age 65 or older; low household income = median household income of the market area is <\$28,100; high unemployment = percent of workforce that is not employed is greater than 8.1 percent; isolated location = air-mile distance to nearest short-term acute care hospital is ≥ 25 miles; low volume = 500 or fewer acute inpatient discharges in 1997.

Source: Analysis of Claritas Corp. estimates based on 1990 census by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

racial or ethnic minorities, which are also associated with above-average financial performance under the PPS but worse overall financial outcomes.

Hospital markets with low household incomes are located throughout the nation, but those with low incomes and high unemployment are concentrated in the East, in the Mississippi valley, Appalachia, and to a lesser extent near the Canadian border (Figure 1-6). Hospital markets with disproportionate minority populations are located predominantly in the South and Southeast (Figure 1-7). How and why these factors affect financial performance under Medicare's inpatient PPS and overall, however, remains unclear.

### Isolation and low volume

Rural health advocates have often cited rural hospitals' physical isolation as a potential risk factor for financial pressures that may threaten residents' access to care. The data, however, provide little evidence

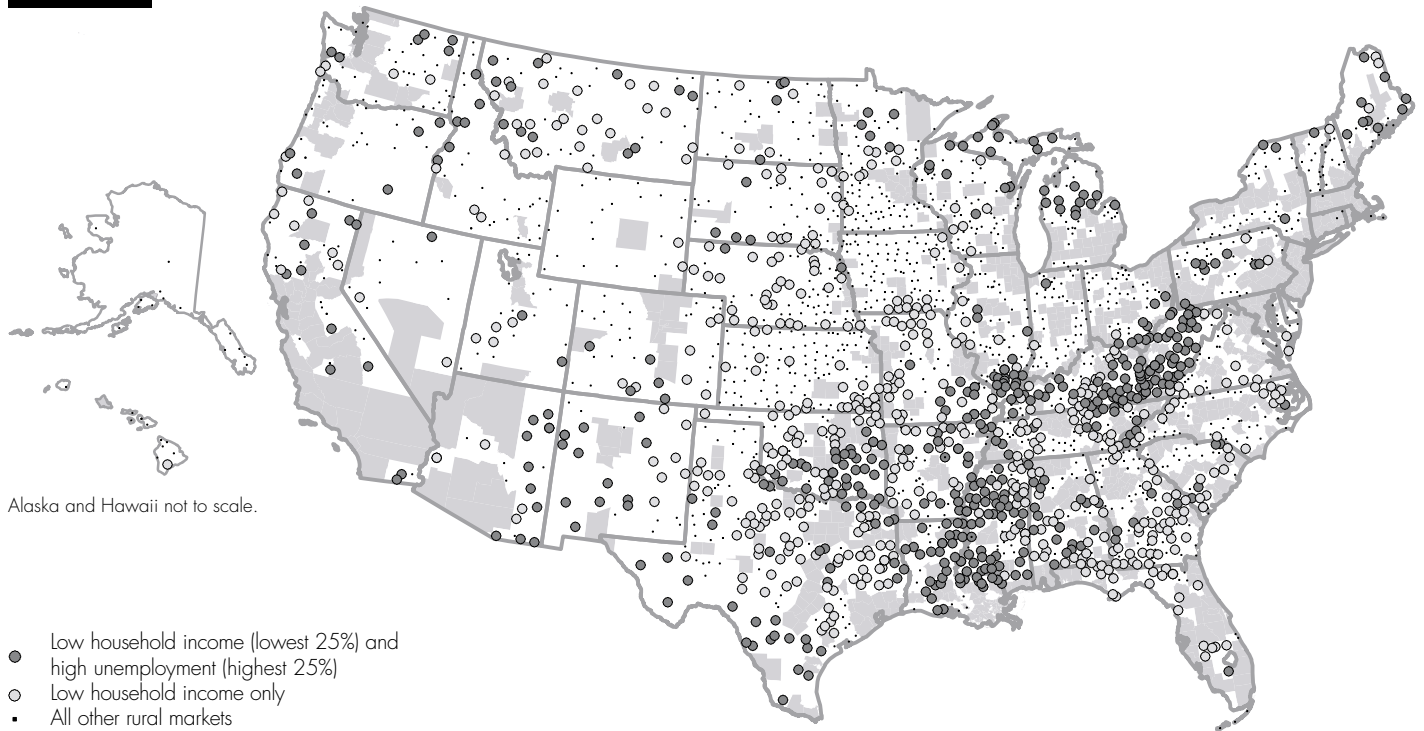
to support this concern. Most isolated rural hospitals—defined as those with no other acute-care hospital within 25 air miles—are located in the West (Figure 1-8).<sup>7</sup> Financial performance under the PPS, on average, is about the same for isolated providers as for all others, and they often have above-average total margins. These outcomes probably reflect to some extent the effects of Medicare's policies aimed at protecting isolated rural hospitals (see Chapter 4).

In contrast, hospitals that produce few inpatient discharges tend to have much lower Medicare inpatient and total margins than other providers. Low-volume providers are located primarily in the Midwest (Figure 1-9), but they are generally not isolated. About 14 percent of low-volume hospitals have another acute-care hospital within 10-15 road miles and half have another facility within 20-25 road miles (see Chapter 4). Finally, isolated and low-volume providers have little overlap across UIC categories (Table 1-2, see p. 14).

<sup>7</sup> Air-mile distances are measured from the population center of a hospital's ZIP code to the ZIP code population center for the nearest hospital.

**FIGURE  
1-6**

## Rural markets with low income and high unemployment

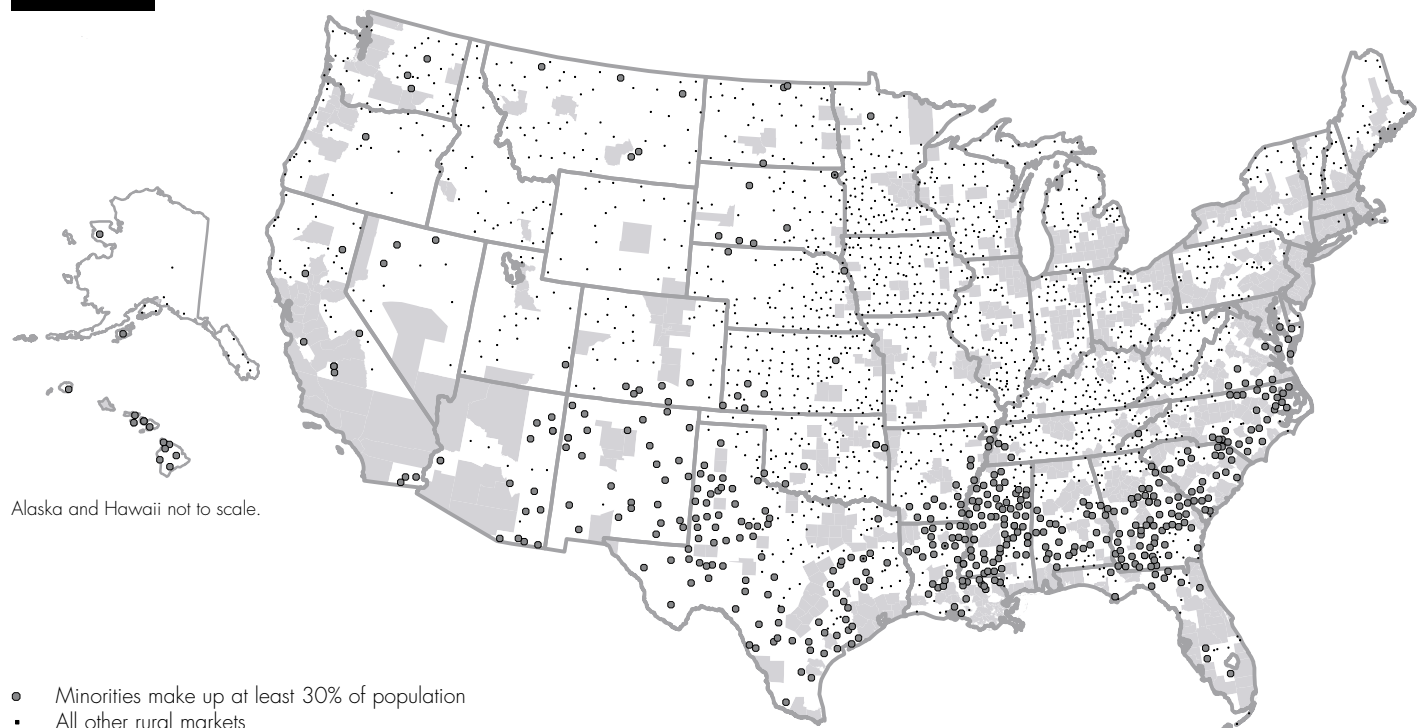


Note: Markets with low household income had median household income of less than \$28,100 in 1999. Markets with low household income and high unemployment also had more than 8.1 percent of resident workforce unemployed. Gray areas represent metropolitan counties, 1999.

Source: Analysis of Claritas Corp. estimates based on 1990 census by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**FIGURE  
1-7**

## Rural markets with a disproportionate minority population

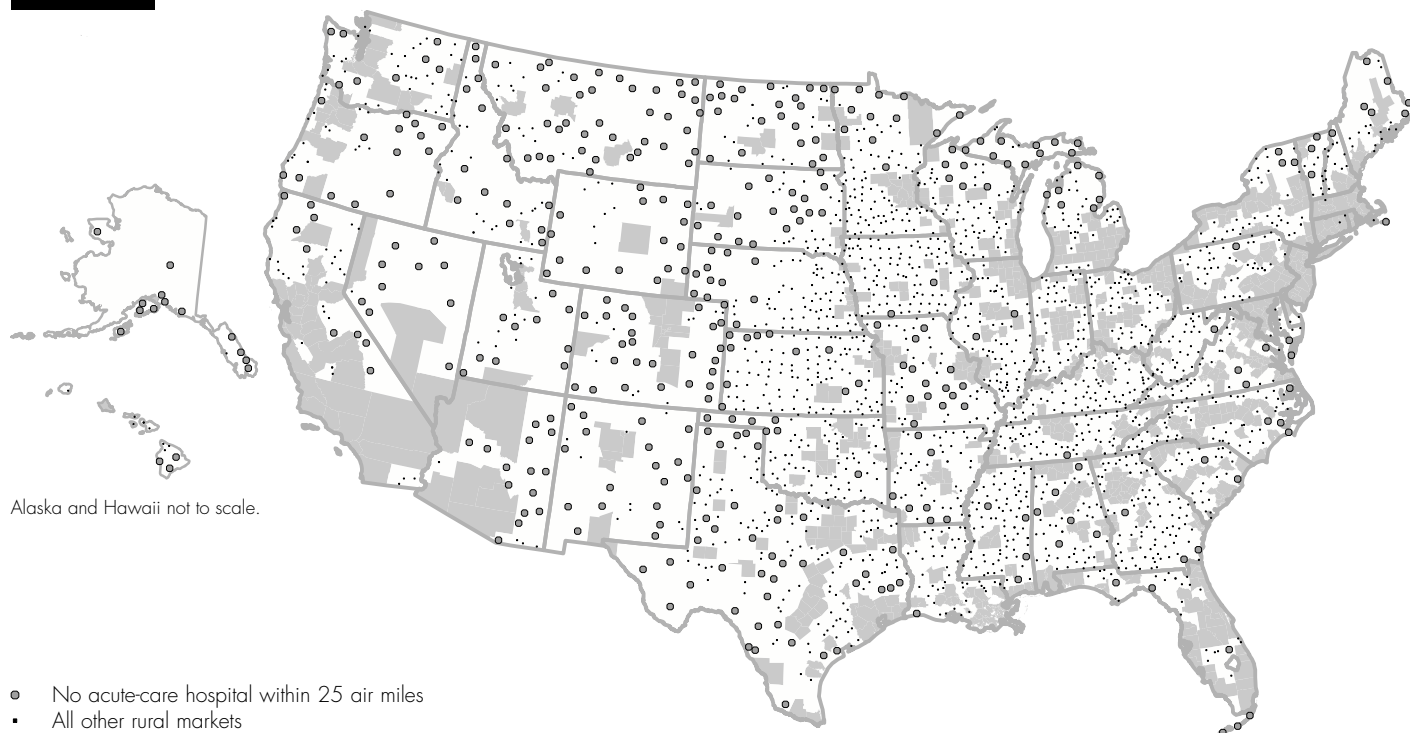


Note: Markets with disproportionate minority population had 30 percent or more non-white or Hispanic in 1999. Gray areas represent metropolitan counties, 1999.

Source: Analysis of Claritas Corp. estimates based on 1990 census by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**FIGURE  
1-8**

## Isolated rural hospitals

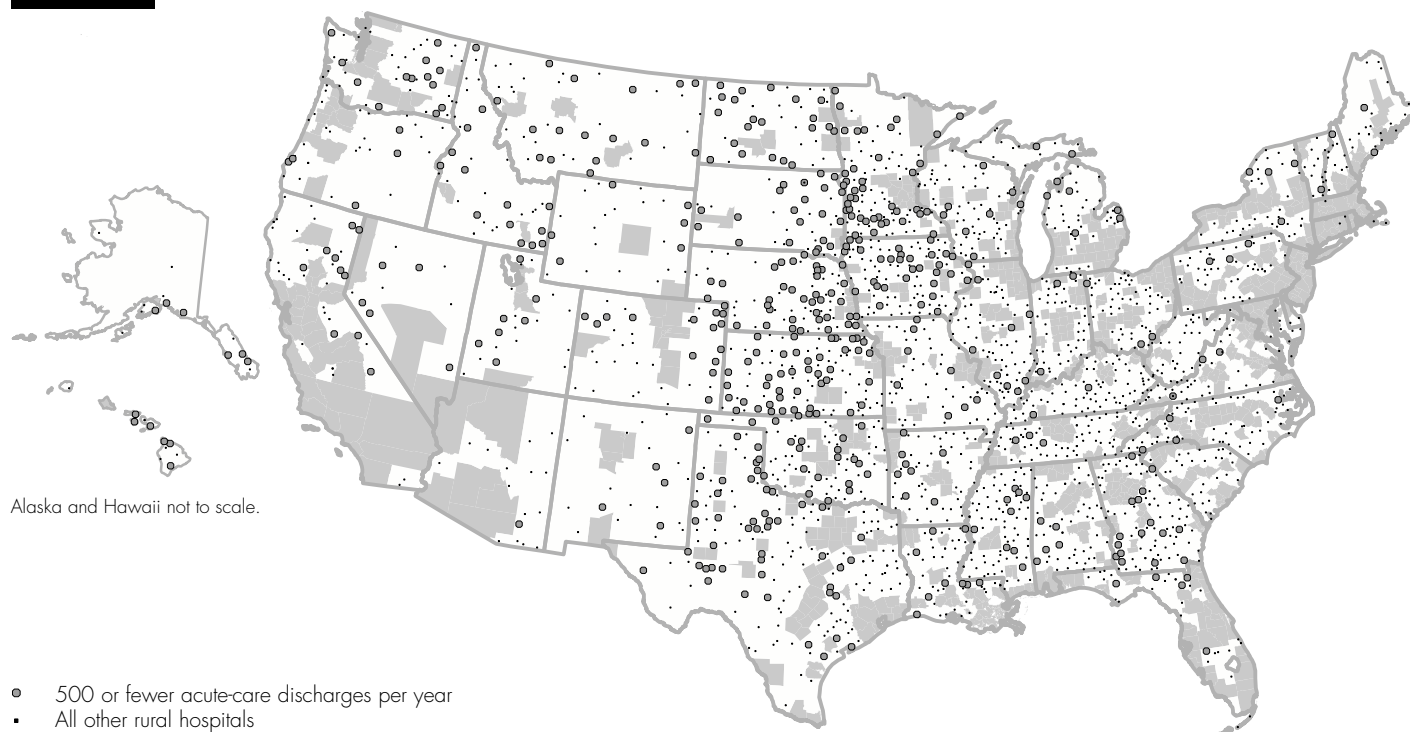


Note: Air-mile distances computed from population centers of hospitals' ZIP codes. Includes all acute-care hospitals in HCFA files in 2000. Gray areas represent metropolitan counties, 1999.

Source: Analysis of HCFA survey and certification data for 2000 by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**FIGURE  
1-9**

## Low-volume rural hospitals



Note: Gray areas represent metropolitan counties, 1999.

Source: Analysis of Medicare cost report data for 1998 by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**TABLE  
1-2****Isolated and low-volume hospitals,  
by location**

Location of hospital (UIC)	Number of hospitals	Isolated	Low-volume	Both
Adjacent to an MSA and includes a town with at least 10,000 people (3, 5)	349	9%	6%	1%
Not adjacent to an MSA but includes a town with at least 10,000 people (7)	314	20	10	3
Adjacent to an MSA but does not include a town with at least 10,000 people (4, 6)	623	13	23	4
Not adjacent to an MSA but includes a town with between 2,500 and 10,000 people (8)	595	23	19	5
Not adjacent to an MSA and does not include a town with at least 2,500 people (9)	271	28	59	21
All rural	2,152	18	22	6

Note: UIC (urban influence code, as defined by the U.S. Department of Agriculture), MSA (metropolitan statistical area, as defined by the U.S. Office of Management and Budget).

Source: Analysis of HCFA survey and certification data for 2000 and Medicare cost report data for 1998 by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.

**Providers' responses to market conditions**

Providers in different markets offer different services (Table 1-3). Those in the most urbanized counties are much

more likely than other rural hospitals to have SNFs (rather than swing beds), rehabilitation units, or psychiatric facilities. Hospitals in the most rural counties are much more likely to have swing beds and nursing facilities for

long-term care; they are unlikely to have SNFs, rehabilitation units, or psychiatric units.

These data are consistent with findings from MedPAC visits to rural providers in 2000. Many rural facilities were using long-term care services and ambulatory care (outpatient and rural health clinic services) as their principal sources of revenue. Without these revenue streams, these hospitals probably would not be financially viable.

**Medicare beneficiaries' use of services**

Policymakers and rural health care advocates have often argued that beneficiaries and others living in rural areas are disadvantaged in obtaining needed care compared with their urban counterparts. This claim is certainly consistent with the weak market conditions just described and parallel suggestions in the literature that many rural residents face substantial obstacles in obtaining care, including low incomes, lack of health insurance, limited local health resources, and long travel distances and times to reach sources of care

**TABLE  
1-3****Rural hospital diversification, by location**

Location of hospital (UIC)	Hospitals	Swing beds	Skilled nursing facility	Nursing facility	Any long-term care	Rehabilitation unit	Psychiatric unit	Home health
Adjacent to an MSA and includes a town with at least 10,000 people (3, 5)	363	30%	45%	9%	69%	16%	34%	30%
Not adjacent to an MSA but includes a town with at least 10,000 people (7)	326	33	53	8	78	18	30	30
Adjacent to an MSA but does not include a town with at least 10,000 people (4, 6)	625	65	32	11	82	3	13	28
Not adjacent to an MSA but includes a town with between 2,500 and 10,000 people (8)	598	67	28	12	82	2	12	31
Not adjacent to an MSA and does not include a town with at least 2,500 people (9)	271	90	26	20	95	1	7	27
All rural	2,183	59	35	12	81	6	18	30

Note: UIC (urban influence code, as defined by the U.S. Department of Agriculture), MSA (metropolitan statistical area, as defined by the U.S. Office of Management and Budget). Counts and percentages based on sub-providers reported on hospitals' Medicare cost reports for 1998.

Source: Analysis of HCFA data from hospitals' Medicare cost reports for 1998 by Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill.



(McConnel and Zetzman 1993, Edelman and Menz 1996, Coburn and Bolda 1999, Schur and Franco 1999).

To examine this issue, we compared the use of health services by urban and rural beneficiaries in Medicare's traditional program in 1999. We also compared the proportions of beneficiaries using

services, services per user, and the mixes of services used among urban and rural areas and across geographic regions. These analyses showed that:

- Urban and rural beneficiaries use similar amounts of care, on average, nationally and within each region.

- Beneficiaries' per capita use of services differs among regions, with those in the South and the West having the highest and lowest average use, respectively.
- Washington, Arizona, and New Hampshire have the highest concentrations of counties with unusually low use rates.

## Analytic methods

To compare urban and rural beneficiaries' per capita service use and the mix of services used, we separated providers' 1999 claims for a 5 percent sample of beneficiaries into 11 service types: short-term hospital inpatient, rehabilitation hospital, long-term hospital, psychiatric hospital, skilled nursing facility (SNF), swing bed, home health, physician, hospital outpatient, ambulatory surgical center (ASC), and rural health clinic (RHC). The physical quantities of most services, however, are not directly comparable either within or across service types. For example, outpatient hip-replacement surgery uses more resources than drawing blood for laboratory tests, and neither is equivalent to inpatient liver transplantation.

To put all services on a common scale, we measured the relative costliness of each service as consistently as possible. For most services paid under one of Medicare's prospective payment systems—physician, short-term hospital inpatient, hospital outpatient, ASC, and SNF—we measured use as the sum of the relative values for all services received multiplied by the national base payment amount. For home health care, we applied the median national payment rates in 1999 for the six home health visit types specified in the Medicare interim payment system. We calculated use of

swing-bed and specialty hospital services (long-term, psychiatric, and rehabilitation care) by adjusting the payments Medicare made to providers by the hospital wage indexes that apply to the providers' locations. For RHC visits, we measured use as the number of visits multiplied by the maximum payment rate per visit in 1999 (\$60.40).

These methods value all services as if they were paid using national payment rates. They provide fair relative measures of service use if two assumptions hold:

- Medicare's relative values for individual services within a service type accurately reflect services' relative costliness.
- The national base payment amounts (conversion factors) accurately measure the relative costliness of services across service types.

After applying these methods, beneficiaries' total use is the sum of measured use over all service types.

To explore differences in beneficiaries' service use among types of rural areas and across regions, we calculated separate national average use rates for counties grouped by urban influence code (UIC) and for four Census regions. To make the results easier to interpret and ensure reasonably large samples, we combined UIC groups

representing large and small metropolitan statistical areas (MSAs) and those adjacent to large and small MSAs, leaving one urban and five rural categories. Except for the most rural UIC in the Northeast, all regional UIC groups had at least 3,000 sample beneficiaries.

To control for differences in beneficiaries' use of services associated with systematic differences in health status, we divided beneficiaries' use rates by their risk scores from the hierarchical condition category (HCC) risk adjustment model. These risk scores represent beneficiaries' expected service use rates given their health status, relative to that of the national average beneficiary. Expected use is based on the beneficiary's risk category, which reflects age, sex, and diagnoses from hospital inpatient, hospital outpatient, and physician visits during the previous year, and on the national average historical spending per beneficiary in each risk category.

Urban beneficiaries in our sample had higher average risk scores (worse health) than rural ones. Because the HCC model does not fully reflect differences in health status, risk-adjusted use rates probably overstate urban beneficiaries' service use.\* Rural beneficiaries' risk-adjusted use rates also may be overstated somewhat if they use relatively few services given their health status. ■

\* Urban beneficiaries' use rates are also somewhat overstated because the population is limited to beneficiaries enrolled in the traditional program. Those enrolled in the Medicare+Choice program are excluded because Medicare+Choice organizations generally do not submit claims. Excluding them, however, overstates urban beneficiaries' use rates because Medicare+Choice enrollees are healthier than average (PPRC 1996, MedPAC 1998, MedPAC 2000).

- Although overall use rates are similar, the mix of services varies; rural beneficiaries use fewer physician and post-acute care services but more hospital outpatient and inpatient services than do their urban counterparts.

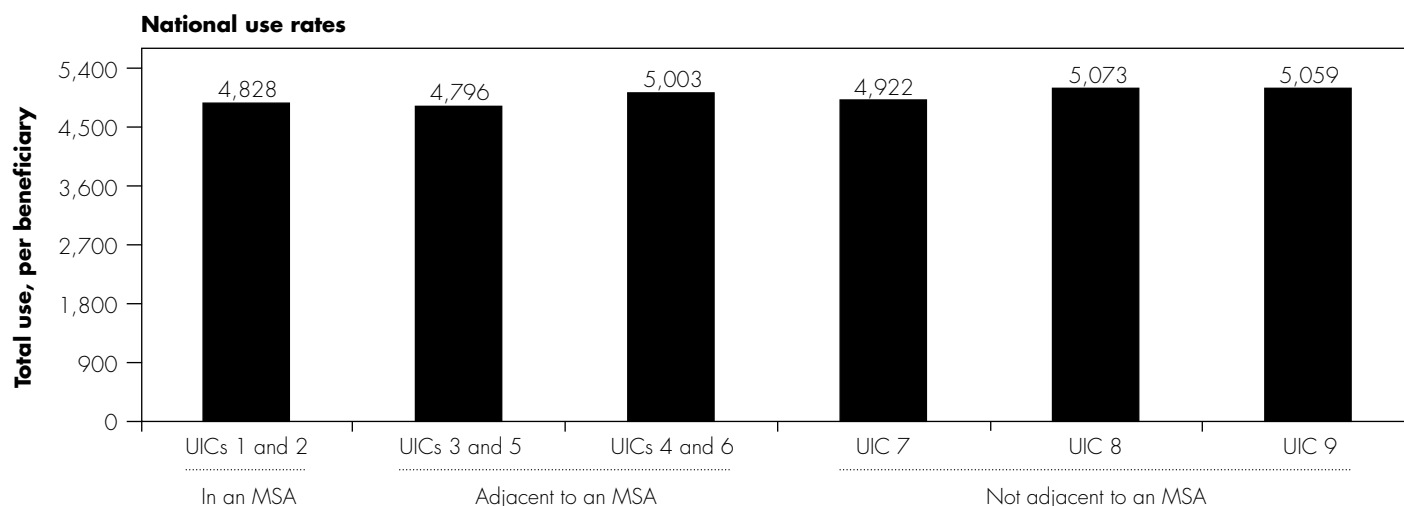
## Use of services in urban and rural areas

The per capita use rate in the urban UIC is similar to rates in the five rural UICs, both nationally and within regions (Figure 1-10).<sup>8</sup> This finding holds

whether or not we adjust for beneficiaries' health status.<sup>9</sup> In contrast, estimated use rates differ between regions. Compared with the national average, per capita service use is 6.0 percent higher in the South and 6.7 percent lower in the West.

**FIGURE 1-10**

## Urban and rural beneficiaries use similar amounts of services, but use rates differ among regions



## Regional use rates

Location of county (UIC)	Nation	Region			
		Northeast	South	Midwest	West
Urban, in an MSA (1, 2)	4,828	4,650	5,092	4,827	4,532
Adjacent to an MSA and includes a town with at least 10,000 people (3, 5)	4,796*	4,396*	5,111	4,718	4,527
Not adjacent to an MSA but includes a town with at least 10,000 people (7)	4,922*	4,339	5,395*	4,750	4,503
Adjacent to an MSA but does not include a town with at least 10,000 people (4, 6)	5,003*	4,541	5,213*	4,867	4,480
Not adjacent to an MSA but includes a town with between 2,500 and 10,000 people (8)	5,073*	4,601	5,469*	4,787	4,688
Not adjacent to an MSA and does not include a town with at least 2,500 people (9)	5,059*	5,504	5,372*	4,815	4,586
All beneficiaries	4,864	4,627	5,156	4,813	4,537

Note: UIC (urban influence code, as defined by the U.S. Department of Agriculture), MSA (metropolitan statistical area, as defined by the U.S. Office of Management and Budget). Use is the sum of services from 11 service types, evaluated at nationally standardized payment rates and adjusted for individual differences in health status. These results include beneficiaries in traditional Medicare and exclude beneficiaries in Medicare+Choice, who make up 21 percent of the Medicare population in urban counties and 4 percent of the population in the five non-urban categories. Northeast includes New England and Middle Atlantic census divisions; South includes South Atlantic, East South Central, and West South Central census divisions; Midwest includes East North Central and West North Central census divisions; West includes Mountain and Pacific census divisions.

\*Indicates statistically different from urban value in same region (5 percent level).

Source: MedPAC analysis of claims from 1999 for a 5 percent random sample of Medicare beneficiaries.

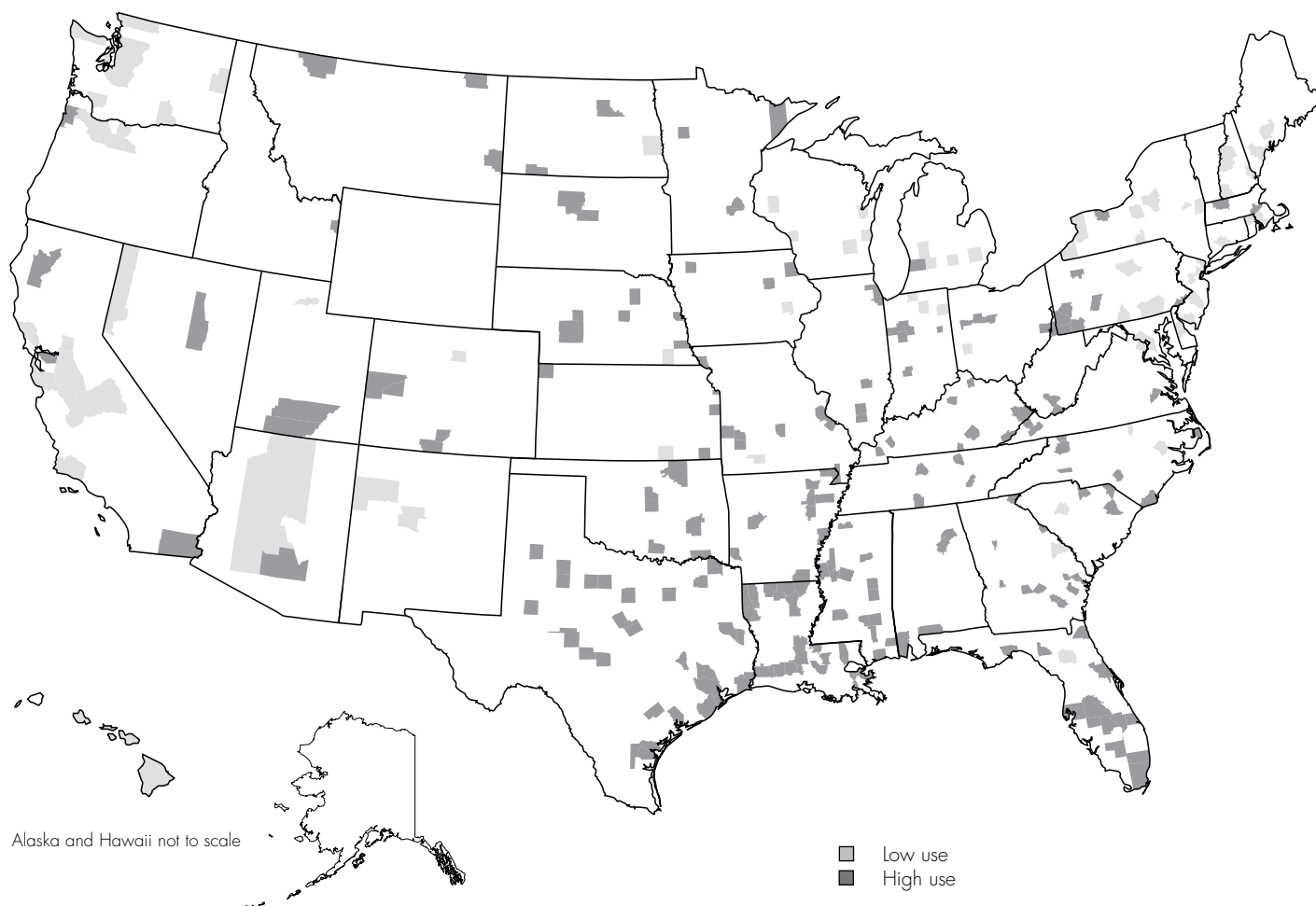
<sup>8</sup> Although differences in these use rates are statistically significant because we have large samples, they are not meaningful.

<sup>9</sup> Without adjustment for health status, urban beneficiaries' use rates range from 2.3 percent to 6.6 percent higher than the use rates in rural UICs; with adjustment, they range from 0.7 percent higher to 4.8 percent lower.



**FIGURE  
1-11**

## Counties with high and low use of services



Note: High use includes counties with rates of service use more than two standard deviations above the national average. Low use includes counties more than two standard deviations below the national average.

Source: MedPAC analysis of claims from 1999 for a 5 percent random sample of Medicare beneficiaries.

We examined geographic differences in use rates more closely by identifying counties with unusually high or low use rates.<sup>10</sup> Louisiana, Texas, Florida, and Mississippi have concentrations of high-use counties; Washington, Arizona, and New Hampshire have disproportionate numbers of low-use counties (Figure 1-11).

Unusually high or low rates do not necessarily mean that beneficiaries are receiving too much, too little, or an

inappropriate mix of care. A clinically based analysis would be needed to determine care appropriateness (see Chapter 2). This analysis serves only to identify counties that should be examined more closely. Some of these counties, for instance, have only a few beneficiaries in our sample. Before undertaking a costly clinical evaluation of their use rates, it probably would be useful to re-estimate use rates with a larger sample of 1999 claims or with claims from several years.

### Interpreting use rates

Differences in use rates should be interpreted cautiously. Beneficiaries in areas with lower rates do not necessarily have less access to care or receive less appropriate care. The relatively low use rates in the West thus might indicate that beneficiaries living there have greater access problems, but further analysis would be necessary to rule out other potential differences, such as providers' practice patterns or beneficiaries'

<sup>10</sup> High- and low-use counties have use rates that fall outside 95 percent confidence limits around the national average use rate, taking into account the number of sample beneficiaries in the county.

preferences and propensities to seek care. Conversely, similar use rates do not imply that all groups are equally well served. Finally, use rate differences may or may not be associated with differences in the quality of health outcomes; outcomes depend on the appropriateness and technical quality—rather than the amount—of the care received.

## The mix of services used

Urban and rural beneficiaries use somewhat different combinations of services, on average. Per capita use of physician services is 7 to 14 percent lower in the rural UICs, compared with the urban UIC (Table 1-4). Although rural beneficiaries are about as likely as those in urban areas to use physicians' services, rural users have fewer visits, on average, than do urban ones. This result may overstate the difference between urban and rural beneficiaries' behavior, however, because the latter often receive physician care in RHCs. After combining physician and RHC services, per capita use in the rural UICs is 3 to 6 percent lower than that in the urban UIC.<sup>11</sup> Conversely, per capita use of physicians' services by urban beneficiaries may be somewhat understated because residents (physicians in training) furnish a substantial volume of care in urban areas, but claims for their services often are not submitted.<sup>12</sup>

Beneficiaries in the rural UICs also use 5 to 15 percent less post-acute care (PAC), which includes home health, SNF, swing-bed, rehabilitation hospital, and long-term hospital services. Rural beneficiaries' lower PAC use is largely driven by lower use of non-hospital PAC services (home health and SNF), offset to some extent by greater use of swing-bed services.

In contrast to physician and PAC services, per capita use of hospital outpatient care is 14 to 28 percent higher in the rural UICs because a higher proportion of rural beneficiaries use at least one outpatient service. Compared with urban beneficiaries, those in rural areas may face more obstacles in obtaining primary care in physicians' offices and thus receive a greater proportion of primary care services in outpatient departments. Rural beneficiaries also may get some care from physician specialists who periodically visit rural outpatient departments. These differences should be interpreted with some caution, however; outpatient service use may be generally understated because of poor coding practices in 1999 before prospective payment began in 2000.

Finally, use of hospital inpatient care per beneficiary is 3 to 13 percent higher in the rural UICs; rural beneficiaries are more likely to be admitted for care at least once and rural users have more admissions per user.<sup>13</sup> Rural areas are much less likely than urban ones to have specialty hospitals, such as long-term and rehabilitation facilities, and they generally have fewer SNFs and home health agencies, which may increase use of short-term and critical access hospitals. Also, rural beneficiaries likely travel greater distances, especially to obtain specialized care. Consequently, physicians may sometimes admit rural beneficiaries for inpatient care in situations where they would use outpatient care if the patient lived closer to the hospital.

## Validating our results

Our results suggesting that urban and rural beneficiaries use similar amounts of care might be viewed as somewhat contrary to conventional wisdom. Consequently, we attempted to validate them using two approaches:

- We examined how well the use rates track counties' adjusted average per capita cost (AAPCC) rates, which are based on per capita program spending in each county from 1990 to 1994, and
- We compared our findings with those reported in the literature on urban and rural beneficiaries' use of health services.

## Use rates and per capita spending

To make fair comparisons, we removed from the AAPCC rates the effects of geographic differences in input prices, indirect graduate medical education payments, and disproportionate share payments to hospitals because these factors are external. We also compared use rates and AAPCC rates without adjustments for health status because they are adjusted with different systems.

After these changes, the national average adjusted AAPCC rate is 6.1 percent higher for urban beneficiaries than for rural beneficiaries. This is similar to the differences in use rates (without adjustment for health status), which average 4.1 percent higher for urban beneficiaries than for rural beneficiaries. County AAPCC rates, however, explain only half the cross-county variation in use rates. We believe the correlation is relatively low at the county level because:

- use rates may be somewhat unstable because they are based on a single year's data and small samples in some counties, while the AAPCC rates are derived from five years of data,<sup>14</sup>
- input-price adjusters for the AAPCC rates poorly reflect input-price differences between counties, and

11 Treating all RHC services as physician services may overstate the volume of physician care. RHC providers did not record service codes on more than half the claims in our database. We assumed each uncoded claim represented a single physician visit.

12 Rural beneficiaries' greater use of hospital outpatient care may exaggerate slightly measured discrepancies between urban and rural beneficiaries' use of physician services. Practice expense differentials tend to discount physician services furnished in outpatient settings compared with those furnished in physicians' offices. Our sensitivity analysis, however, suggests that this effect is probably quite small.

13 Hospital inpatient care includes inpatient services received in short-term and critical access hospitals.

14 From a regression of county use rates against AAPCC rates, unexplained errors in use rates are often very large for counties with small samples. Unexplained errors of the same magnitude did not occur for counties with large samples.

**TABLE  
1-4**

**Per capita use of services by beneficiaries in traditional Medicare,  
by type of service and location of county, 1999**

**Location of county (UIC)**

Service type	Urban, in an MSA (1, 2)	Adjacent to an MSA		Not adjacent to an MSA		
		Includes a town with at least 10,000 people (3, 5)	Does not include a town with at least 10,000 people (4, 6)	Includes a town with at least 10,000 people (7)	Includes a town with between 2,500 and 10,000 people (8)	Does not include a town with at least 2,500 people (9)
Physician	1,276	1,188*	1,186*	1,195*	1,139*	1,117*
Physician+RHC	1,280	1,214*	1,246*	1,231*	1,212*	1,230*
Hospital outpatient	541	616*	625*	642*	664*	690*
Hospital inpatient	2,185	2,250*	2,363*	2,319*	2,473*	2,452*
Post acute**	684	602*	653*	628*	623*	593*
SNF+home health	502	461*	467*	478*	453*	426*
Swing beds	1	8*	24*	13*	30*	49*
Other	138	114	116	103	101	94
Total	4,828	4,796	5,003*	4,922*	5,073*	5,059*

Note: UIC (urban influence code, as defined by the U.S. Department of Agriculture), MSA (metropolitan statistical area, as defined by the U.S. Office of Management and Budget), RHC (rural health clinic), SNF (skilled nursing facility). Hospital inpatient combines short-term and critical access hospitals. "Other" combines ambulatory surgical center and psychiatric hospital services. Use is services evaluated at nationally standardized payment rates and adjusted for individual differences in health status. These results include beneficiaries in traditional Medicare and exclude beneficiaries in Medicare+Choice, who make up 21 percent of the Medicare population in urban counties and 4 percent of the population in the five non-urban categories.

\*Indicates statistically different from urban value (5 percent level).

\*\*Post acute also includes two categories (not shown) for rehabilitation and long-term hospital services.

Source: MedPAC analysis of claims from 1999 for a 5 percent random sample of Medicare beneficiaries.

- the AAPCC spending data are much older (1990-1994) than are the use rate data.

The discrepancies between county use rates and AAPCCs caused by these limitations are largely random at the county level, so they likely cancel out when rates are aggregated at the national level.

### Use rates in the literature

It is difficult to compare our total use rate estimates to the literature because we combined 11 service types and most other studies examined no more than 3. In the only comparable study, the Prospective Payment Assessment Commission (ProPAC 1996) had consistent results—rural beneficiaries' use of services was approximately 2 percent higher than that of their urban counterparts.

Moreover, our results for specific services generally are consistent with those of other published studies. The most frequently analyzed service is physician care. Miller, Holahan, and Welch (1995) measured use of physician care with relative value units (RVUs) from the physician fee schedule. They compared the average RVUs of services used by rural and urban beneficiaries. This is similar to our method of comparing the average of the RVUs multiplied by the national conversion factor in the physician fee schedule. They found, as we have, that rural beneficiaries use less physician care than those living in urban areas.

Examining only annual physician visits per person, Himes and Rutrough (1994) found elderly rural residents had fewer visits. If we count visits per beneficiary, ignoring differences in service complexity (RVUs), we find a similar result. In contrast, McConnel and Zetzman (1993)

found urban and rural elderly do not differ either in the percentage with at least one physician visit or the annual number of visits per person. Their results, however, are based on a relatively small national survey of 3,500 people age 70 and older, including 1,102 rural residents.

Himes and Rutrough also found that non-farm rural elderly have more hospital inpatient stays per beneficiary, which is consistent with our results. Conversely, McConnel and Zetzman found that rural elderly are not statistically more likely to have at least one hospital stay. Although the differences between urban and rural beneficiaries' admission rates are smaller in our data, we have a much larger sample (2 million beneficiaries) and thus greater power to detect significant differences.

Our analysis of home health use is consistent with Kenney (1993a, 1993b), who found that urban beneficiaries were

more likely to use home health care. In contrast, Rabiner (1995) found little difference between urban and rural elderly residents' probabilities of using home health services. However, she used data from 1982-1984, and the home health market has grown considerably since then.

Finally, our analysis of the use of SNF services is not consistent with Dubay (1993), who found rural beneficiaries are more likely to use SNF services. However, the SNF market has grown substantially since the year of her data (1987), so comparisons with our results may not be meaningful.

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## Potential implications for Medicare and other public policies

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Our findings support two conclusions. First, although we cannot infer that Medicare beneficiaries living in rural areas always receive all of the care they need, the available evidence does not suggest that they have serious, widespread or unique problems. On average, they receive about the same amount of services (but a somewhat different mix) as their

urban counterparts. Second, some rural communities may have difficulty sustaining the health care infrastructure needed to meet their residents' needs because they are facing a combination of one or more conditions, such as small and declining populations, low household incomes, high unemployment, or disproportionate numbers of minority residents. These conditions often make it harder to attract and retain providers because they limit the demand for services, raise providers' unit costs, or reduce providers' revenues by increasing uncompensated care burdens.

Attempting to provide the full range of modern medical services in all rural areas with today's costly technologies would not be desirable, even if it were possible. Given low levels of demand, providers would operate at inefficient volumes, raising costs and compromising service quality.

Nevertheless, Medicare's policies still must adapt to accommodate differences in market conditions that would affect efficient providers' costs but are beyond their control (MedPAC 2001). This is necessary to achieve Medicare's objectives of ensuring beneficiaries' access to medically necessary acute care

of high quality and promoting efficient production and distribution of acute care products and services. Because Medicare buys products and services from providers who compete for resources in private markets, it must establish payment rates that approximate the prices that would prevail in the long run given the conditions in local health care markets.

The remaining chapters of this report suggest a number of actions that we believe policymakers in the Congress and HCFA should take to better adapt Medicare's policies to conditions in rural markets. In general, these policy changes involve adjusting providers' payment rates to reflect how market conditions affect their costs and revenues.

Even if Medicare's payment rates reasonably accommodate the diversity of conditions in rural markets, however, providers may not be able to cover their fixed costs and may stop furnishing certain kinds of care or exit the market. Although Medicare often accounts for half or more of rural providers' revenues in many markets, other payers still play important roles. Thus, where market conditions are weak, Medicare's policies can provide only part of the solution. ■

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